

**Amendments to the Claims**

This listing of claims will replace all prior versions, and listing, of claims in the application:

1. (currently amended) A carriage servo control system for servo-controlling a movement of carriage means in a vertical direction to a track formed on a recording medium, in which the carriage means has detecting means mounted thereon for transmitting an optical beam to the track so as to perform at least one of recording and reproduction of information on and from the track, said carriage servo control system comprising:

error signal producing means for producing an error signal showing an error between a radiated position of the optical beam on the recording medium and a position of the track;

periodic signal producing means for producing a periodic signal of which period is constant and previously determined so as to correspond to a movement accuracy of the carriage means;

duty ratio control means for changing a duty ratio of the periodic signal on a basis of characteristic of the error signal produced to produce a changed periodic signal having the duty ratio changed;

drive signal producing means for producing a drive signal to move the carriage means on a basis of both the changed periodic signal produced and the error signal produced; and

supplying means for supplying the drive signal produced to moving means configured to move the carriage means in the vertical direction so as to move said carriage means by the moving means on a basis of the drive signal supplied.

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wherein said duty ratio control means changes the duty ratio based on a difference between a maximum value and a minimum value of the error signal to produce the changed periodic signal.

2. (canceled)

3. (original) The carriage servo control system according to claim 1, wherein said periodic signal producing means produces the periodic signal made up of only a signal component with a frequency not more than a predetermined frequency.

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4. (currently amended) The carriage servo control system according to claim [[2]] 1, wherein said periodic signal producing means produces the periodic signal made up of only a signal component with a frequency not more than a predetermined frequency.

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5. (original) The carriage servo control system according to claim 1, wherein said drive signal producing means produces the drive signal on a basis of a partial error signal and the changed periodic signal, said partial error signal serving as the error signal having a value not less than a predetermined threshold value.

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6. (currently amended) The carriage servo control system according to claim [[2]] 1, wherein said drive signal producing means produces the drive signal on a basis of a partial error signal and the changed periodic signal, said partial error signal serving as the error signal having a value not less than a predetermined threshold value.

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7. (original) The carriage servo control system according to claim 3,  
wherein said drive signal producing means produces the drive signal on a  
basis of a partial error signal and the changed periodic signal, said partial  
error signal serving as the error signal having a value not less than a  
predetermined threshold value.

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8. (original) The carriage servo control system according to claim 4,  
wherein said drive signal producing means produces the drive signal on a  
basis of a partial error signal and the changed periodic signal, said partial  
error signal serving as the error signal having a value not less than a  
predetermined threshold value.

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9. (original) The carriage servo control system according to claim 5,  
wherein said drive signal producing means multiplies the changed periodic  
signal and the partial error signal produced together to produce the drive  
signal.

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10. (original) The carriage servo control system according to claim 6,  
wherein said drive signal producing means multiplies the changed periodic  
signal and the partial error signal produced together to produce the drive  
signal.

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11. (original) The carriage servo control system according to claim 7,  
wherein said drive signal producing means multiplies the changed periodic  
signal and the partial error signal produced together to produce the drive  
signal.

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12. (original) The carriage servo control system according to claim 8,  
wherein said drive signal producing means multiplies the changed periodic  
signal and the partial error signal produced together to produce the drive  
signal.

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13. (original) The carriage servo control system according to claim 1,  
wherein said drive signal producing means produces the drive signal on a  
basis of a partially changed periodic signal and the error signal, said partially  
changed periodic signal serving as the changed periodic signal and being  
included within a period previously determined based on the error signal.

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14. (currently amended) The carriage servo control system according  
to claim [[2]] 1, wherein said drive signal producing means produces the drive  
signal on a basis of a partially changed periodic signal and the error signal,  
said partially changed periodic signal serving as the changed periodic signal  
and being included within a period previously determined based on the error  
signal.

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15. (original) The carriage servo control system according to claim 2,  
wherein said drive signal producing means produces the drive signal on a  
basis of a partially changed periodic signal and the error signal, said partially  
changed periodic signal serving as the changed periodic signal and being  
included within a period previously determined based on the error signal.

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16. (original) The carriage servo control system according to claim 3,  
wherein said drive signal producing means produces the drive signal on a

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basis of a partially changed periodic signal and the error signal, said partially changed periodic signal serving as the changed periodic signal and being included within a period previously determined based on the error signal.

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17. (original) A carriage servo control system according to claim 12, wherein said drive signal producing means multiplies the partially changed periodic signal and the error signal together to produce the drive signal.

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18. (original) A carriage servo control system according to claim 14, wherein said drive signal producing means multiplies the partially changed periodic signal and the error signal together to produce the drive signal.

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19. (original) A carriage servo control system according to claim 15, wherein said drive signal producing means multiplies the partially changed periodic signal and the error signal together to produce the drive signal.

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20. (original) A carriage servo control system according to claim 16, wherein said drive signal producing means multiplies the partially changed periodic signal and the error signal together to produce the drive signal.

21. (canceled)

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22. (new) A carriage servo control system for servo-controlling a movement of carriage means in a vertical direction to a track formed on a recording medium, in which the carriage means has detecting means mounted thereon for transmitting an optical beam to the track so as to perform at least one of recording and reproduction of information on and from the

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track, said carriage servo control system comprising:

error signal producing means for producing an error signal showing an error between a radiated position of the optical beam on the recording medium and a position of the track;

periodic signal producing means for producing a periodic signal of which period is constant and previously determined so as to correspond to a movement accuracy of the carriage means;

duty ratio control means for changing a duty ratio of the periodic signal on a basis of characteristic of the error signal produced to produce a changed periodic signal having the duty ratio changed;

drive signal producing means for producing a drive signal to move the carriage means on a basis of both the changed periodic signal produced and the error signal produced; and

supplying means for supplying the drive signal produced to moving means configured to move the carriage means in the vertical direction so as to move said carriage means by the moving means on a basis of the drive signal supplied,

wherein said drive signal producing means produces the drive signal on a basis of a partial error signal and the changed periodic signal, said partial error signal serving as the error signal having a value not less than a predetermined threshold value.

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~~23.~~ (new) A carriage servo control system for servo-controlling a movement of carriage means in a vertical direction to a track formed on a recording medium, in which the carriage means has detecting means mounted thereon for transmitting an optical beam to the track so as to perform at least one of recording and reproduction of information on and from the

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track, said carriage servo control system comprising:

error signal producing means for producing an error signal showing an error between a radiated position of the optical beam on the recording medium and a position of the track;

periodic signal producing means for producing a periodic signal of which period is constant and previously determined so as to correspond to a movement accuracy of the carriage means;

duty ratio control means for changing a duty ratio of the periodic signal on a basis of characteristic of the error signal produced to produce a changed periodic signal having the duty ratio changed;

drive signal producing means for producing a drive signal to move the carriage means on a basis of both the changed periodic signal produced and the error signal produced; and

supplying means for supplying the drive signal produced to moving means configured to move the carriage means in the vertical direction so as to move said carriage means by the moving means on a basis of the drive signal supplied,

wherein said drive signal producing means produces the drive signal on a basis of a partially changed periodic signal and the error signal, said partially changed periodic signal serving as the changed periodic signal and being included within a period previously determined based on the error signal.

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